

Illinois Environmental Protection Agency
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Project Summary for a
Construction Permit Application from
Metropolitan Biosolids Management, LLC for a
Heat Drying Plant in
Stickney, Illinois

Site Identification No.: 031051APL
Application No.: 04110024

Illinois EPA Contacts:

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Important Dates

Application Received: November 9, 2004
Comment Period Begins: June 5, 2005
Public Hearing: July 20, 2005
Comment Period Closes: August 19, 2005

I. **INTRODUCTION**

Metropolitan Biosolids Management, LLC, (MBM) has submitted an application for a permit to construct a sewage sludge drying plant. The plant would be located on the grounds of the Metropolitan Water Reclamation District of Greater Chicago's (MWRD's) existing Stickney wastewater treatment plant and receive treated sewage sludge from that plant. MBM would then dry the material for use as fertilizer or similar product.

The proposed plant requires an air pollution control construction permit because it would be a source of emissions. The Illinois EPA has prepared a draft of the construction permit that it would propose to issue for the plant. The permit is intended to identify the applicable rules governing emissions from the plant and to set limitations on those emissions. The permit is also intended to establish appropriate compliance procedures for the plant, including requirements for emissions testing, continuous monitoring, recordkeeping and reporting.

II. **PROJECT DESCRIPTION**

The proposed plant would dry wet sludge in four identical drying lines. All material handling and processing activities at the plant would be enclosed.

As described in the application, the proposed plant is designed to handle approximately one third of the wet sludge produced by the Stickney wastewater treatment plant. This material is also referred to as "biosolids" by MBM. Biosolids is a term adopted by USEPA for the nutrient-rich organic material resulting from the treatment of wastewater. The use of biosolids as fertilizer is regulated by USEPA to assure that such material can be safely applied to maintain and improve soils and support plant growth.

The wet sludge material from the MWRD, with a moisture content of approximately 75 percent by weight, would be received at the proposed plant by an enclosed conveying system and stored in silos. From the silos, the wet material would be pumped to hoppers and then to mixers or "coaters," which combine the wet material with material that has already been dried. The coaters would then feed the dryers.

These wet material handling operations would be enclosed in the processing building, with emissions controlled by a two-stage scrubber system. This system is designated the "Odor Control Scrubbing System" by MBM, as it is designed to control emissions of odorous compounds, as well as emissions of particulate matter (PM) and volatile organic material (VOM). This system would exhaust to the atmosphere through an 85 foot tall stack.

The wet material would be dried in four indirectly heated dryers. The dryers would be heated by circulating hot "thermal oil" through tubes in each dryer, so that wet material would not be exposed to or come into contact with any combustion gases. The exhaust from each of the four dryer units would first pass through its own condenser to remove

moisture and then its own scrubber for control of particulate. These four systems would then exhaust to a common thermal oxidizer system for control of VOM. This oxidizer system would have two afterburners, a primary unit and a back-up unit. This system would exhaust to the atmosphere through the same 85 foot tall stack as the Odor Control Scrubber System.

The dried material from each dryer would pass to a series of processes to separate undersize "fine" material and oversize material from pellets of dried material that are in the desired size range for the product (about 1/8 inch). Pellets of the proper size would continue on to the product storage silos, to await bulk shipment by truck. Oversize and undersize material would be returned to the coaters, to go back through the dryers. The emissions from handling and processing of dry material would first be controlled by fabric filters. The exhaust from the filter for the pellet cooler on each drying line, in which warm pellets from the dryers are cooled, would then be ducted to the common thermal oxidizer system. The exhausts from the filters on the other processes would then be ducted to the odor control scrubber system.

The thermal oil circulated through the dryers would be heated in three oil-fired heaters, each with a rated capacity of 27 million Btu per hour. These heaters may be fired with used or reclaimed oil, as well as virgin fuel oil. These heaters will be equipped with low NO_x burners for the control of nitrogen oxide (NO_x) emissions. The exhaust from the heaters will be vented to a two-stage scrubber system. The first scrubber in the system will be a Venturi scrubber designed for control of particulate matter emissions. This will be followed by a caustic scrubber for control of emissions of sulfur dioxide (SO₂).

III. EMISSIONS

The plant will be a source of emissions due to the handling and processing of the sludge material and the combustion of fuel in the thermal oil heaters and the thermal oxidizer system. The permitted emissions of the plant are summarized in Table 1.

Dust or particulate matter emissions from the various process units will be controlled by scrubbers and filters, to remove particulate from the exhaust before discharge to the atmosphere. Emissions of volatile organic material from the units would be controlled by scrubbers and combustion in the thermal oxidizer system, to either collect or destroy emissions in the exhaust stream. As odors exist as particulate and gaseous organic compounds, these control systems would also serve to control potential emissions of odorous compounds from the plant.

Combustion emissions from the thermal oxidizer system are minimized by the selection of natural gas as the fuel. Combustion emissions from the oil-fired thermal heaters are controlled by a combination of combustion practices and add-on scrubbers. Combustion practices, including modern low-NO_x burner technology, would be used for control of emissions of carbon monoxide, organic materials and nitrogen oxides, which are products of the combustion process. A two-stage scrubber system would be used to control emissions of pollutants that are the

result of the ash, sulfur and other components in the oil fuel for the heaters. The first scrubber would control the emissions of particulate matter, which is a result of the non-combustible material or ash in the oil. This scrubber would be of a Venturi design, in which the exhaust stream passes through a narrow throat, where water is injected to impact and collect fine particulate matter. This scrubber would also control the emissions of lead and other metals in the exhaust, which would be present as particulate matter. The second scrubber would control the emissions of sulfur dioxide, a gaseous pollutant that results when the sulfur contained in the oil is burned. This would be accomplished by adding caustic (sodium hydroxide or NaOH) to the scrubbing water to react with and collect the SO₂ in the exhaust. This process would also control emissions of hydrogen chloride (HCl) in the exhaust, which are a result of the trace levels of chlorinated compounds contained in the oil fuel.

IV. APPLICABLE EMISSION STANDARDS

All emission sources in Illinois must comply with the Illinois Pollution Control Board's emission standards. The Board's emission standards represent the basic requirements for sources in Illinois. The Board has standards for sources of nitrogen oxides, carbon monoxide, volatile organic material, sulfur dioxide, and particulate matter. This project should readily comply with all applicable Board emission standards.

In addition, the thermal oil heaters would be subject to the federal New Source Performance Standard (NSPS) for new small steam generating units, 40 CFR 60 Subpart Dc. This NSPS limits the sulfur content of the oil fuel that can be used in the heaters to no more than 0.5 lb/million Btu. This requirement is met by the fuel oil supply planned for the heaters.

As the oil supply to these heaters contains reclaimed oil, the Board's regulations for handling and disposal of waste also establish requirements for the fuel oil supply. These regulations limit the total halogen content of used or reclaimed oil to less than 1,000 ppm. This requirement is met by the fuel oil supply planned for the heaters. These regulations also impose requirements on the suppliers of used oil to ensure that the used oil that they provide complies with this specification.

V. APPLICABLE REGULATORY PROGRAMS

MBM is designing the proposed plant so that it would not be a major project pursuant to the federal rules Prevention of Significant Deterioration (PSD), 40 CFR 52.21, and the state's rules for Major Stationary Sources Construction and Modification (MSSCAM), 35 IAC Part 203. For this purpose, the proposed MBM plant has been reviewed as a proposed modification to the MWRD's Stickney wastewater treatment plant since the proposed plant would be located on the site of and directly linked to this existing plant. As the Stickney plant is a major source for both PSD and MSSCAM rules, the emissions of PM, NO_x, VOM and the PSD pollutants emitted from the plant have to be below the significant

emission emissions thresholds set by these rules for the plant to maintain status as a minor project. For example, under the MSSCAM rules, annual emissions of PM10, NOx and VOM must currently be less than 15, 40 and 25 tons, respectively. Under the PSD rules, annual emissions of CO, SO2 and lead must be less than 100, 40 and 0.6 tons, respectively

As a modification to the existing Stickney plant, the effect of the proposed plant on the status of the Stickney plant also had to be considered for emissions of hazardous air pollutants (HAPs). The Stickney plant is currently a minor source of HAP emissions, as recognized by its Clean Air Act Permit Program (CAAPP) permit. That is, annual emissions from the plant of each individual HAP are less than 10 tons and total emissions of all HAPs are less than 25 tons. The proposed plant would not change this status, i.e., the combined emissions of the two plants would still be below the thresholds that define a major source for emissions of HAPs.

Even though the proposed plant is considered a modification to the Stickney wastewater treatment plant, the nature of the relationship between MBM and the MWRD is such that MBM will have separate permits from the MWRD. As well as obtaining its own construction permit, MBM will also have to obtain and maintain its own CAAPP operating permit in the future for the continuing operation of the proposed plant.

In addition, because MBM is pursuing a construction permit for its proposed plant separate from MWRD, the plant qualifies as a new pollution control facility for purposes of Section 39.2 of Illinois' Environmental Protection Act. As such MBM had to obtain approval from the Village of Stickney, the local governmental authority, for the siting of the proposed plant. MBM has obtained the requisite approval from the Village for the plant. The approval addresses the processing of wet sludge received from the MWRD Stickney Works, as well as the use of reclaimed oil as fuel in the thermal oil heaters.

VI. CONTENTS OF PERMIT

The permit establishes emission limitations and other requirements on the proposed plant to assure that equipment is properly operated to control emissions. These requirements also serve to ensure that the project would not be a major modification pursuant to the federal PSD rules or the state's MSSCAM rules or cause the MWRD Stickney plant to become a major source for emissions of HAPs.

The permit conditions also establish compliance procedures that the Permittee must implement to demonstrate that the plant operates on an ongoing basis within the limitations and requirements set by the permit and is properly controlling its emissions. These compliance procedures include requirements for emission testing, operational monitoring, periodic inspections, recordkeeping, and reporting.

In particular, upon completion of construction, MBM would be required to have testing of emissions conducted for the three systems that control the plant's emissions, i.e., the Odor Control Scrubbing System, the thermal oxidizer system, and the scrubber system for the thermal

oil heaters. The purpose of this testing would be to confirm that these systems have been properly designed and constructed so as to comply with applicable requirements. This testing would also establish the normal operating parameters for these systems, which will then be monitored and tracked on a continuing basis to confirm that these systems are being properly operated and maintained.

VI. **REQUEST FOR COMMENTS**

It is the Illinois EPA's preliminary determination that the project meets all applicable state and federal air pollution control requirements, subject to the terms and conditions proposed in the draft permit. The Illinois EPA is therefore proposing to issue a construction permit for this project.

Comments are requested on this proposed action by the Illinois EPA and on the terms and conditions of the draft permit.

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Table 1: Permitted Emissions of the Proposed Plant (tons/year)

Equipment/ Process	PM/ PM10	NO _x	CO	SO ₂	VOM	Lead	Hydrogen Chloride	Form- Aldehyde
Material Handling	0.44	-	-	-	0.44	-	-	-
Dryers	0.88	8.35	4.33	6.66	0.44	0.05	-	-
Thermal Heaters	12.19	31.25	10.92	16.25	0.62	0.30	0.16	0.13
Oil Storage Tanks	-	-	-	-	0.44	-	-	-
Road Dust	1.00	-	-	-	-	-	-	-
Total	14.51	39.60	15.25	22.91	1.94	0.35	0.16	0.13